CLAIMS

1. An aircraft heated floor panel, comprising:

a plurality of layers cured together to form a lower support level and an upper heater level;

a metal face sheet for protecting the top of the panel from floor-traffic related damage; and

a pressure sensitive adhesive bonding the metal face sheet to the underlying support/heater layers.

2. An aircraft heated floor panel as set forth in claim 1, wherein the support layer includes a honeycomb layer sandwiched between fiber layers.

3. An aircraft heated floor panel as set forth in claim 1, wherein the heater level comprises a resistive element encapsulated in cured thermoset plastic plies.

4. An aircraft heated floor panel as set forth in claim 1, wherein the metal face sheet is made of a metal selected from aluminum, titanium, steel, or stainless steel.

5. An aircraft heated floor panel as set forth in claim 1, wherein the support layer includes a honeycomb layer sandwiched between fiber layers, the heater level comprises a resistive element encapsulated in cured thermoset plastic plies, and the metal face sheet is made of aluminum.

6. An aircraft heated floor panel as set forth in claim 1, wherein the underlying support/heater layers include a high temperature curing adhesive layer between the support level and the heater level.

7. An aircraft heated floor panel as set forth in claim 1, wherein the pressure sensitive adhesive is an acrylic pressure sensitive adhesive.

8. An aircraft heated floor panel as set forth in claim 1, wherein the pressure sensitive adhesive is a rubber pressure sensitive adhesive.

9. An aircraft heated floor panel as set forth in claim 1, further comprising a primer to enhance the bonding characteristics of the adhesive.

10. In combination, an aircraft and the aircraft heated floor panel of claim 1, wherein the perimeter of the lower support level is supported by a structure of the aircraft.

11. A method of making the aircraft heated floor panel of claim 1, said method comprising the steps of:

applying a layer of the pressure sensitive adhesive to the top of the heater level,

placing the metal face sheet on top of the adhesive layer,

curing the support/heater layers and the metal face sheet at an elevated curing temperature, and

cooling the cured layers and the metal face sheet to an ambient temperature;

wherein the pressure sensitive adhesive layer allows the metal face sheet to expand and contract at a different thermal expansion rate than the support/heater layers during the curing and cooling steps.

12. A method as forth in claim 11, wherein the curing temperature is at least about 250° F.

13. A method as set forth in claim 11, wherein the layer of the pressure sensitive adhesive is about 0.010 inch and wherein the curing temperature is about 260° F.

14. A method as set forth in claim 11, wherein the face sheet is cut to net shape prior to the curing step.

15. A method as set forth in claim 11, wherein a surface treatment is applied to the face sheet prior to the curing step.

16. A method of making an aircraft floor panel, said method comprising the steps of:

compiling a plurality of curable layers together to form a lower support level and an upper heater level,

applying a layer of a pressure sensitive adhesive to the top of the structure,

placing a metal face sheet on top of the pressure sensitive adhesive layer,

curing the support/heater layers, the pressure sensitive adhesive layer, and the metal face sheet at an elevated curing temperature, and

cooling the cured layers and the metal face sheet to an ambient temperature;

wherein the pressure sensitive adhesive layer allows the metal face sheet to expand and contract at a different thermal expansion rate than the support/heater layers during the curing and cooling steps.

17. A method as forth in claim 16, wherein the curing temperature is at least about 250° F.

18. A method as set forth in claim 17, wherein the layer of the pressure sensitive adhesive is about 0.010 inch and wherein the curing temperature is about 260° F.

19. An aircraft heated floor panel, comprising:

a plurality of layers cured together to form a lower support level and an upper heater level, these support/heater layers together having a certain rate of thermal expansion;

a face sheet for protecting the top of the panel from floor-traffic related damage, the face sheet having a different rate of thermal expansion than the underlying support/heater layers; and

an elastic adhesive bonding the face sheet to the underlying support/heater layers whereby the different rates of thermal expansion may be accommodated during curing procedures.

20. An aircraft heated floor panel as set forth in claim 19, wherein the face sheet has a higher rate of thermal expansion than the underlying support/heater layers.

21. An aircraft heated floor panel as set forth in claim 20, wherein the face sheet is made of metal.

22. An aircraft heated floor panel as set forth in claim 21, wherein the metal is selected from aluminum, titanium, steel, or stainless steel.

23. An aircraft heated floor panel as set forth in claim 21, wherein the elastic bonding adhesive is a pressure sensitive adhesive.

24. An aircraft heated floor panel as set forth in claim 23, wherein the pressure sensitive adhesive is an acrylic pressure sensitive adhesive.

25. An aircraft heated floor panel as set forth in claim 23, wherein the pressure sensitive adhesive is a rubber pressure sensitive adhesive.

26. A method of making the aircraft heated floor panel of claim 19, said method comprising the steps of:

applying a layer of the elastic bonding adhesive to the top of the heater level;

placing the face sheet on top of the adhesive layer;

curing the support/heater layers and the face sheet at an elevated curing temperature to form a composite structure; and

cooling the composite structure to an ambient temperature;

wherein the elastic bonding adhesive layer allows the face sheet to expand and contract at a different thermal expansion rate than the support/heater layers during the curing and cooling steps.

27. A method as set forth in claim 26, wherein the face sheet is cut to net shape prior to the curing step.

28. A method as set forth in claim 26, wherein a surface treatment is applied to the face sheet prior to the curing step.

29. A method of making the aircraft heated floor panel, comprising the steps of:

compiling a plurality of curable layers together to form a lower support level and an upper heater level;

applying a layer of an elastic bonding adhesive to the top of the structure;

placing a face sheet on top of the adhesive layer;

curing the support/heater layers, the adhesive layer, and the face sheet at an elevated curing temperature to form a composite structure; and

cooling the composite structure to an ambient temperature;

wherein the elastic bonding adhesive layer allows the face sheet to expand and contract at its different thermal expansion rate during the curing and cooling steps.

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